Terms of Reference on " Energy Audit at Public and Private Institution"

1. BACKGROUND

Alternative Energy Promotion Center (AEPC) is the focal agency to promote Renewable Energy and Energy Efficiency in the country. The development objective of AEPC is to improve the living standards, increase employment and productivity of rural women and men, reduce dependency on traditional energy, and attain sustainable development by integrating alternative energy with the socio-economic activities of women and men in rural and urban communities.

After the National Energy Efficiency Strategy 2018 was embraced, AEPC was appointed as the government entity responsible for energy efficiency (EE) efforts in Nepal. AEPC is now responsible for advancing energy efficiency and facilitating communication among various national institutions and stakeholders engaged in EE programs and initiatives. Additionally, AEPC has received the mandate to implement energy efficiency measures in the country. With its new mandate in energy efficiency, AEPC is working to support the Government in achieving its Sustainable Development Goal 7.3, which is doubling the rate of energy efficiency improvement by 2030. This effort will ultimately support the goal of universal access to clean, sustainable, and reliable energy by saving energy through energy efficiency measures.

Furthermore, the proposed Energy Efficiency Act, currently tabled in Parliament, aims to institutionalize energy efficiency practices, set regulatory frameworks, and create an enabling environment for energy-efficient solutions across various sectors. AEPC is actively involved in aligning its programs and initiatives with the forthcoming legislation to ensure a coordinated approach to energy efficiency in Nepal.

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2. OBJECTIVES

The main objective of this task is to carry out energy assessment of high energy consuming institution/ facility, industries, commercial/ public buildings and private institution.

3. SCOPE OF WORKS

After signing of the contract, the consultant organization is expected to follow the standard methodology of the energy audit: In coordination with AEPC team the consultant is expected to coordinate with the client entity and conduct walkthrough, prepare scope of energy audit, collect complete data as per the defined scope, Analyse the data, present the draft report to the client entity in presence of AEPC staff and submit the final report with the feedback incorporation. Following bullets presents the detail scope of work for the energy audit.

- Co-ordinate with AEPC team to understand the task.
- Coordinate with relevant officials for understanding the energy use and consumption at the facility and finalize the energy audits tools and equipment.
- Conduction of walk through audit.
- Engage in discussions and conduct at least three meetings with the officials of the selected institutions. These meetings should follow the initial walk-through and aim to define the scope of the energy audit comprehensively. Ensure that all relevant aspects are covered and agreed upon during these discussions to facilitate an effective audit process.
- Observe, measure, and collect the relevant data from the Energy Analyzer for a minimum of 10 days at each site.
- Analyze the energy saving options and recommend for energy performance improvement of entire facility.
- Reporting on existing condition- fuel type, power consumption, and calorific values.
- Reporting on existing condition of – transformer ratings, NEA contract/ approved demand, capacitor ratings (if applicable), diesel generator (DG) capacity, cogeneration capacity (if applicable) and maximum demand.
- List of major component wise electrical loads, connected loads, total connected load in kW and drives, power backup in the facility.
- Latest (24 months) month wise baseline data of NEA electricity consumption, DG base generation and other applicable fuel consumption.
- Incurred source wise and average cost of electricity use in kWh.
- Reporting on Energy efficiency improvements opportunities with cost benefits analysis in both electrical as well as thermal areas (as necessary) but not limited to:
    - Electric load and demand management
    - Power factor improvement

- Electrical motors and pumps
- Fans and blowers
- Lighting system
- Refrigeration and Air conditioning system
- Boiler and steam system
- Opportunities in Furnace
- Thermal Insulation
- Waste heat recovery opportunities
- House keeping
- Energy cost per unit output production with benchmark identification etc.

❖ Reporting on Energy efficiency improvements opportunities along with detail technical specifications of measures and their current & realistic market prices.

❖ Brief feasibility study for installation of cogeneration, if applicable.

❖ Financial analysis of recommended EE intervention and calculate NPV, IRR, Payback considering the cost of equipment provided by the vendor.

❖ Prepare an outline for Energy Management plan considering the continual improvement approach as ISO 50001:2011.

❖ Presentation of energy audit outcomes, report writing and report submission to AEPC and respective institutions. For final reports please take reference from Government of Nepal, Water and Energy Commission Secretariat, Energy Audit Guidelines 2077 and for special requirements, please see annexes.

❖ Incorporation of signature of all human resources in submitted reports and presence of all human resources at time of presentation.

❖ Conduct energy audit in following three different institutions within the country i.e.

1. Bharatpur hospital located in ward no. 10 of Bharatpur Metropolitian City, Chitwan, Bagmati Province.

2. Milan Dairy and Foods Industries Pvt.Ltd. located in ward no. 05 of Rupani Municipality, Saptari, Madhesh Province.

3. Purveli Pet Industries Pvt.Ltd. located in ward no.03 of Budhiganga Rural Municipality, Morang, Koshi Province.

4. **DELIVERABLE :-**

- Inception report within a week of contract agreement.
- Draft report and presentation within 2.5 months upon task completion.
- Three hard copies and one soft copy of final report after incorporation of comments/ inputs provided within contract duration period.

5. **HUMAN RESOURCES :-**

The consulting firm must be legally registered in Nepal with up to date clearance of taxation and must comply all the legal requirements of the Government of Nepal.

Consulting Company must submit the signed CV of proposed Team which must include the HR enlisted but not limited to below:

SN	Position	Qty.	Qualification	Experience
1	Team leader (Energy efficiency expert)	1	Should have minimum bachelor degree in industrial/ electrical/ mechanical/ process/ chemical engineering followed by master degree in the field of engineering or management or relevant sector with professional experiences in the field of energy efficiency and energy auditing. S/he should be a certified energy auditor. Must have acquired Energy audit training certificate of 21 days.	8 years & above
2	Energy Auditor	3	Should have minimum bachelor degree in industrial/ electrical/ mechanical/ process/ chemical engineering. S/he should be a	4 years & above

SN	Position	Qty.	Qualification	Experience
			certified energy auditor. Must have acquired Energy audit training certificate of 21 days.	

6. **CONTRACT PERIOD/TIME AND BUDGET:**

- **Contract period/Time:** There will be a contract agreement between AEPC and Consulting Company/Consultant. The consultant is expected to complete the tasks within **3.5 months** from the date of contract agreement.
- **Budget and Payment Schedule:** Payments will be made from the AEPC budget. Total payments will be dispersed after the submission and approval of the final report.

Annex 1: Energy Audit Report Format (According to EA guideline 2077)

A. Title Sheet of the report to indicate:

B. Acknowledgements:

C. Study Team:

D. Table of Contents:

E. List of instruments used:

F. Executive summary:

- Baseline details of the audited entity (see format in annex 2)
- EE Option summary table (see format in annex 3)
- Categorization of EE options into short, medium and long term

Chapter 1: INTRODUCTION:

1.1 Background of the study:

1.2 Scope of energy audit:

1.3 About the unit:

1.4 Audit methodology (how it was done?):

Chapter 2: Plant Energy Systems:

2.1 Electrical Energy Use features:

2.2 Thermal Energy Use features:

Chapter 3: Strategic Energy Management Program:

Chapter 4: Energy Efficiency Opportunities:

Chapter 5: Exhibits: Vendor information:

Chapter 6: Exhibits: information & details to support the report findings:

Chapter 7: Exhibits: information on incentive schemes available if any:

Annex 2: Baseline Information format

Parameters	**Information**
Name of Industry/Commerce/Institution:	
Year of Establishment (A.D.):	
Scale: (Large/Medium/Small)	
Reference baseline year A.D.:	
Production Capacity (MT/KL/Numbers)	
Annual Production (MT/KL/Numbers)	
Location:	
Total and built up area (m^2)	
Contact Person:	
Designation:	
Telephone Number:	
E-mail:	
Website:	
No of Employees:	
Presence of Energy Manager:	
Compliance with any National/International Standard (NS/ISO):	
Energy Aspects:	
A) Electrical Energy	
A1) From NEA Grid in kWh:	
Total Electricity Consumption from Grid (kWh/year):	
Total Cost of Grid Electricity (NPR/year):	
Per unit cost of grid electricity in NPR:	
A2) From Generators (Captive):	
Types of Fuel used:	
Fuel Consumed in Liters/year:	

Parameters	**Information**
Total DG Capacity in kVA:	
Diesel Energy Generated in kWh:	
DG Electricity Consumption kWh/MT or kWh/KL	
% of Electrical Energy Generated from DG Set:	
Total Cost of DG Electricity in NPR:	
Per unit cost of DG Electricity in NPR:	
A1+A2)	
Total Electrical Energy Consumed (Grid+Captive) in kWh/year:	
Cost of Total Electrical Energy Consumed (Grid+Captive) in NPR:	
B) Thermal Energy	
B1) Types of Fuel used:	
Quantity of fuel consumed in Liter or Kilogram:	
Total cost of Fuel in NPR:	
B2) Types of Fuel used:	
Quantity of fuel consumed in Liter or Kilogram:	
Total cost of Fuel in NPR:	
(B1+B2)	
Total Thermal Energy Consumption in kCal:	
Total Cost of Thermal Energy Consumed in NPR:	
Key Parameters:	
Annual Turnover in Million NPR:	
Capacity Utilization in %:	
Weighted Average Unit Cost of Electrical Energy in NPR:	
Specific Thermal Energy Consumption in kCal/MT or kCal/KL or kCal/Number or kCal/Area :	
Specific Electrical Energy Consumption in kWh/MT or kWh/KL or kCal/Number or kCal/Area:	
Total Annual Cost of Electrical + Thermal Energy in NPR:	

Annex 3: Format for Summary table of EE measures

SN	Energy Efficiency Options (with quantification suggested change)	Annual Demand Saving (kVA)	Annual Electrical Energy Saving (kWh)	Annual Thermal* Saving (Coal, Rice husk, Bagasse, Diesel, FO, Kerosene LPG etc.) Saving (Liter or kilogram)	Annual Cost Saving (NPR)	Investment Potential (NPR)	Payback Period (Months)
1							
2							
3							
4							
5							
…							
Total		kVA	kWh	Ltr. or Kg	NPR	NPR	Months

***Note:** the calorific value of the fuel to be provided per kg of solid fuels and per liter of liquid and gaseous fuel in the report. In addition, the source and or reason for the calorific value taken for calculation to be mentioned properly.

Narration:

- Total Number of options, total kVA saving, Total kWh saving and Total fuel saving to be narrated
- Total Cost Saving and Total Investment need with the total payback period to be narrated

Cost Estimate to "Energy Audit for Preparation of Baseline and Benchmark in Public Institution, Private Institution, Industry and Commercial Buildings "

S.N	Particulars	Quantity	Unit	Rate(Nrs.)	Amount	Remarks
Human Resources Cost						
		Other Expenses				
6	Travel expenses (Local Transport)					
7	Stakeholder Consultation Meeting					
9	Report preparation, report printing, binding and communications					
10	Professional liability Insurance					
11	Miscellaneous					
	Sub Total					
	Total					
	VAT (13%)					
	Total With VAT					

S.N.	Evaluation Criteria	Points
1	**General experience and specific experience of the consultants (Firms) related to the assignment:**	**20**
A.	General Experience of Firm (Minimum experience required: 3 Years)	**5**
A1.	*General Experience 3 years to 5 years*	*2*
A2.	*General Experience 5 years to 7 years*	*3*
A3	*General Experience > 7 years*	*5*
B.	Experience of carrying energy management plan and energy related activities	**10**
B1.	*Experience of carrying out 1 to 3* energy management plan and energy related activities	*2*
B2.	*Experience of carrying out > 3 to 5* energy management plan and energy related activities	*6*
B3.	*Experience of carrying out > 5* energy management plan and energy related activities	*10*
C.	Experience of Carrying energy audit and its implementation	**5**
C1.	*Experience of carrying out 1 to 3 energy audit and its implementation*	*2*
C2.	*Experience of carrying out > 3 to 5 energy audit and its implementation*	*3*
C3.	*Experience of carrying out > 5 energy audit and its implementation*	*5*
2	**Adequacy of the proposed work plan and methodology with respect to the ToR**	**35**
A.	Realistic methodology to carry out the task in concurrence with provided proposal guidelines.	10
B.	Commitment on presence of proposed experts for presentation of their previous audit and their signature on reports	10
C.	Innovative approaches & critical analysis to execute the task	5
D.	Practical Manning and Work schedule	5
E.	Overall structure & quality of the proposal	5
3	**Qualifications and competence of the key human resource for the Assignment** *(Note: Each team member will be evaluated as per below mentioned marking system and average of the mark obtained by team under each heading will be considered as final mark under that heading)*	**45**
A.	General Qualification of the personnel as per ToR	15
B.	Additional Qualification of the personnel	10
C.	HR number of carrying out Energy audit, Energy management plan and Energy related activities	20
C1	*HR number of carrying out energy audit, energy management plan & energy related activities* *8 number -Team leader (Energy efficiency expert)* *4 number –Energy auditor*	*20*
	Total Points	**100**
	The Minimum Technical Score Required to pass	**70**